

Three new deep-water species of *Phos* Montfort, 1810 (Gastropoda: Buccinidae) from the South Pacific

Koen FRAUSSEN

Leuvensestraat 25, B-3200 Aarschot, Belgium

koen.fraussen@skynet.be

KEYWORDS. Gastropoda, Buccinidae, *Phos*, new taxa.

ABSTRACT. *Phos alabastrum* sp. nov. and *P. boucheti* sp. nov. are characterized by a striking bicarinate protoconch, a character they have in common with the Carribean species of *Antillophos* Woodring, 1928. The colour of the protoconch and the absence of strong sculpture on the teleoconch distinguish both species from the Australian *P. sculptilis* Watson, 1886. *P. deforgesii* sp. nov. differs from the preceding species and from some species of *Hinia* (Nassariidae) in having a siphonal notch.

RÉSUMÉ. *Phos alabastrum* sp. nov. et *P. boucheti* sp. nov. sont tous deux caractérisés par leur protoconque présentant un cordon spiral fortement développé, un caractère qu'ils ont en commun avec les espèces du genre *Antillophos* Woodring, 1928, des Caraïbes. La morphologie de la protoconque et de la téléoconque distingue les deux espèces. *P. deforgesii* sp. nov. diffère considérablement des deux espèces précédentes et se distingue de certaines espèces appartenant au genre *Hinia* (Nassariidae) par la présence d'une entaille siphonale.

INTRODUCTION

Recent deep-sea biodiversity exploration in the South Pacific by Institut de Recherche pour le Développement (IRD, Nouméa, formerly ORSTOM) and Muséum National d'Histoire Naturelle (MNHN, Paris) has brought to light many hundreds of new or little known species of molluscs and other benthic invertebrates. As a result of these expeditions, over 400 new species of molluscs have been described from the deep waters off New Caledonia alone (see, among others, Crosnier & Bouchet 1991, Bouchet 1994, Bouchet & Marshall 2001).

Species of the genus *Phos* are well represented in this collection. *Phos* Montfort, 1810 comprises a large genus of small buccinids, largely present in all tropical seas. Sowerby (1866) reported on this genus in his famous "Thesaurus Conchyliorum or Monographs of Genera of Shells". Since then, no review or comprehensive evaluation occurred and this genus, or in fact the whole subfamily Photinae, is highly in need of revision.

A detailed study of the extensive New Caledonian material belonging to *Phos* will be possible only in the context of a review including all Indo-Pacific species. Because of the vast amount of work for such revision, the scope of this paper is restricted to describe some peculiar species. The present paper is a suite to Harasewych (1991), Vermeij & Bouchet

(1998) and Fraussen & Hadorn (2003) who started describing the New Caledonian Buccinidae.

The material reported on in the present study originates from various expeditions conducted since 1984:

(a) CHALCAL and MUSORSTOM 5 expeditions to the Coral Sea, and especially Chesterfield-Bellona Plateau (Richer de Forges *et al* 1986, Richer de Forges 1990);

(b) VOLSMAR and MUSORSTOM 8 expeditions to Vanuatu and the New Hebrides Arc (Volcanos Hunter & Matthew) (Richer de Forges 1990, Richer de Forges *et al* 1996);

(c) BORDAU 1 expedition to the Lau Ridge in the Fiji Islands (Richer de Forges *et al* 2000);

(d) BORDAU 2 expedition to Tonga (no published cruise report yet).

The three new species described in the present paper are not uncommon on the slopes of submerged guyots, isolated reefs and small islands, and it is remarkable that, despite an intensive sampling effort, they have never been collected on the slopes of large islands. In the New Caledonian region they are present on the Coral Sea plateau and guyots, but not around New Caledonia proper. In Vanuatu they are present off Anatom, the small southernmost island, and on the slopes of submerged volcanoes further South, but not off Santo and the other large islands. In Fiji they are present on the slopes of the Lau Islands, but not on those of the main islands Viti

Levu and Vanua Levu. Finally, they are present off small islands of Tonga.

All three species have a multispiral protoconch indicating planktotrophic larval development and good dispersal capabilities. *Phos alabaster* sp. nov. and *P. boucheti* have distributions extending from Coral Sea to Tonga; *P. deforgesi* is so far known only from the Coral Sea, but based on its protoconch morphology it should be expected to have a broader distribution.

ABBREVIATIONS

AMNH	American Museum of Natural History, New York, U.S.A
AMS	Australian Museum, Sydney, Australia
IRD	Institut de Recherche pour le Développement, Nouméa, New Caledonia.
MNHN	Muséum national d'Histoire naturelle, Paris, France
NMNZ	Museum of New Zealand <i>Te Papa Tongarewa</i> , Wellington
KF	collection Koen Fraussen, Belgium
alc	in alcohol collection (MNHN)
dd	empty shell, dead collected
lv	collected alive
juv	juvenile specimen/shell
CP	(chalut à perche) beam trawl
DC	(drague Calypso) Calypso dredge
DE	(drague épibenthique) epibenthic sledge
DW	(drague Warén) Warén dredge

SYSTEMATICS

Family **BUCCINIDAE** Rafinesque, 1815

Genus *Phos* Montfort, 1810

Type species (by monotypy) *Murex senticosus* Linnaeus, 1758, West Pacific.

The genus was described by Montfort to accommodate a number of small species with siphonal notch, different from *Nassarius*. Several subgenera and related genera have been described since. *P. alabastrum* sp. nov. and *P. boucheti* sp. nov. both have a protoconch sculpture identical to the Caribbean *Antillophos* Woodring, 1928. A thorough study is needed to evaluate which genera are valid and what is their relationship. Pending such studies, the species described as new in this paper are placed in the genus *Phos*.

Phos alabastrum sp. nov.

Figs. 1-5, 16

Type material. Holotype (30.7 mm) and paratype 1 (MUSORSTOM 5 stn DW260) MNHN. Paratype 2 (MUSORSTOM 5 stn DW273) MNHN. Paratypes 3-4 (MUSORSTOM 5 stn DW258) MNHN. Paratypes 5-10 (MUSORSTOM 5 stn DW255) 2 MNHN, 1 AMNH, 1 AMS, 1 NMNZ, 1 KF.

Type locality. Coral Sea, Capel Bank, MUSORSTOM 5, stn DW260, 25°29'S, 159°44'E, 285 m.

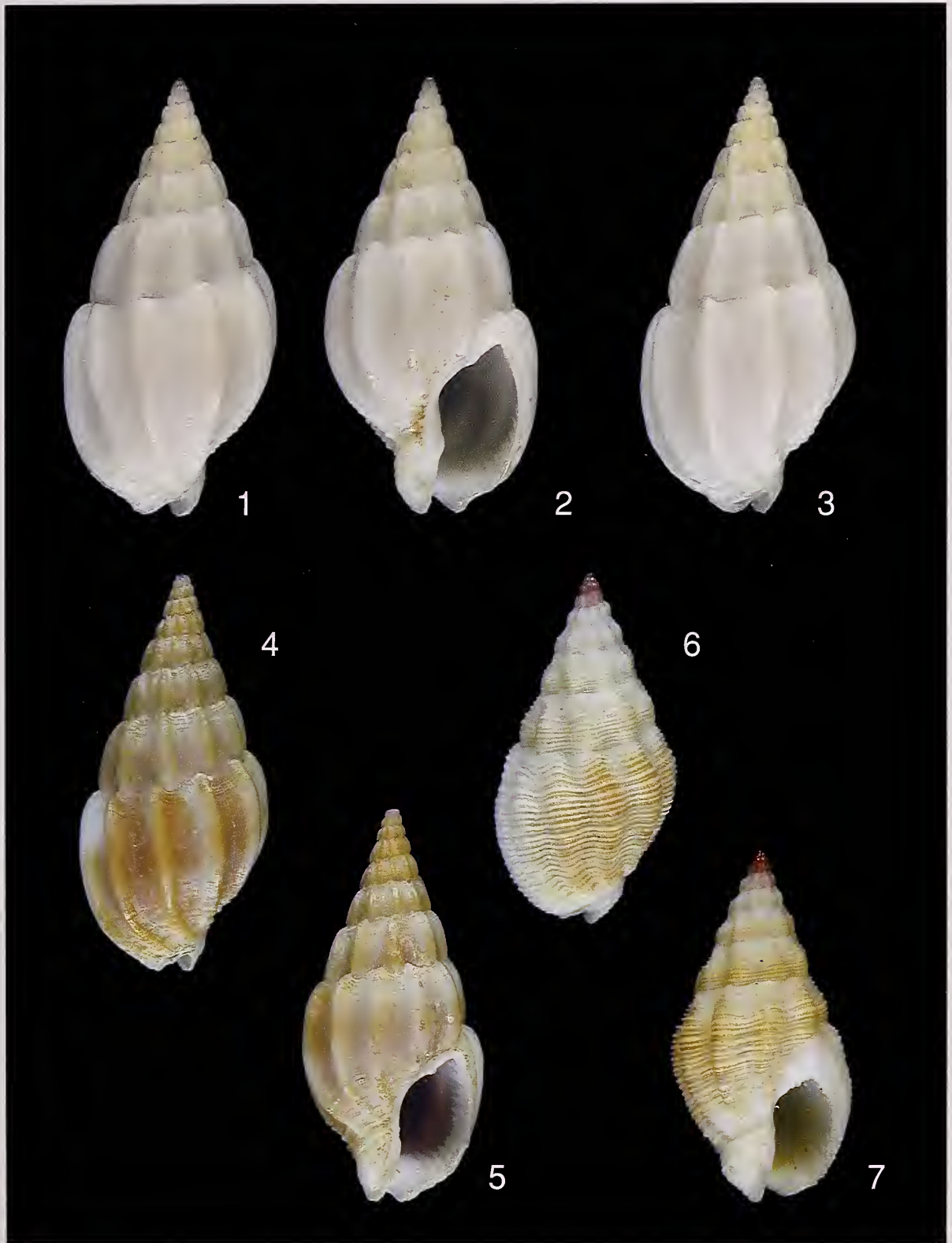
Material examined. Southern Coral Sea: Nova Bank: CHALCAL: stn CP17, 22°34'70"S, 159°15'30"E, 295 m, 1 dd. - Stn D65, 22°11'50"S, 159°15'40"E, 305 m, 2 dd (1 juv). - Stn D66, 22°26'40"S, 159°19'80"E, 320 m, 3 dd. - Stn D67, 22°34'80"S, 159°09'40"E, 277 m, 2 dd (1 subfossil). - Stn D68, 22°35'20"S, 159°15'50"E, 296 m, 1 dd. - MUSORSTOM 5: stn DW298, 22°44'S, 159°22'E, 320 m, 1 lv alc. - Stn DW302, 22°10'S, 159°23'E, 345-360 m, 2 dd (1 juv). - Stn DW303, 22°12'S, 159°23'E, 332 m, 2 dd (1 juv). - Stn CP318, 22°27'S, 159°21'E, 330 m, 1 dd juv. - Stn CP320, 22°25'S, 159°13'E, 315 m, 1 lv. - **Argo Bank:** MUSORSTOM 5: stn DW290, 23°06'S, 159°26'E, 300 m, 1 dd. - Stn DW294, 23°11'S, 159°30'E, 272 m, 2 dd (1 juv). - Stn DW295, 23°13'S, 159°32'E, 279 m, 4 dd juv. - **Kelso Bank:** MUSORSTOM 5: stn DW277, 24°11'S, 159°35'E, 270 m, 2 dd juv. - Stn DW280, 24°10'S, 159°36'E, 270 m, 4 dd juv. - Stn DW281, 24°11'S, 159°34'E, 272 m, 3 dd (2 juv). - Stn DW282, 24°12'S, 159°32'E, 226-230 m, 1 lv, 8 dd (1 juv). - Stn DW284, 24°10'S, 159°33'E, 225-230 m, 1 lv. - Stn DW285, 24°09'S, 159°34'E, 245-255 m, 1 lv, 1 dd juv. - Stn CP289, 24°02'S, 159°38'E, 273 m, 9 dd (3 juv). - **Capel Bank:** MUSORSTOM 5: stn DW252, 25°09'S, 159°55'E, 300-310 m, 1 dd. - Stn DW255, 25°15'S, 159°55'E, 280-295 m, 10 lv (5 juv) (4 alc), 8 dd (3 juv). - Stn DW256, 25°18'S, 159°53'E, 290-300 m, 3 lv, 2 dd. - Stn DW258, 25°33'S, 159°46'E, 300 m, 3 dd. - Stn DW260, 25°29'S, 159°44'E, 285 m, 2 dd. - Stn DW261, 25°27'S, 159°46'E, 300 m, 1 dd, 2 lv alc. - Stn DW263, 25°21'S, 159°46'E, 150-225 m, 1lv. - Stn DW265, 25°21'S, 159°45'E, 190-260 m, 5 dd (2 juv), 21 lv alc (5 juv). - Stn DW266, 25°20'S,

Figures 1-7

1-3. *Phos alabastrum* sp. nov. Coral Sea, Capel Bank, 25°29'S, 159°44'E, 285 m deep. 1-2. Holotype, 30.7 mm. 3. Paratype 1, 28.9 mm.

4-5. *Phos alabastrum* sp. nov., Fidji, 19°43'S, 178°10'W, 270-288 m deep, 29.4 mm.

6-7. *Phos sculptilis* Watson, 1886, Australia, Broome, coll. KF, 19.9 mm.



159°46'E, 240 m, 9 dd (1 juv). - Stn DW270, 24°49'S, 159°34'E, 223 m, 7 lv (2 juv) (3 alc), 8 dd (7 juv). - Stn DW273, 24°43'S, 159°43'E, 290 m, 3 dd (2 juv). - Stn DW274, 24°45'S, 159°41'E, 285 m, 1 lv juv, 2 dd (1 juv). - Stn CP276, 24°49'S, 159°41'E, 258-269 m, 1 dd. - "Chesterfield-Bellona Plateau", no precise data, Chalcal, 3 dd.

"off New Caledonia": From local collector, dredged off New Caledonia at 300-450 m", 1 lv, KF nr.3014.

Vanuatu: MUSORSTOM 8, stn DW967, 20°19'S, 169°53'E, 295-334 m, 1 dd juv.

Volcans Hunter & Matthew: VOLSMAR, stn DW7, 22°26'S, 171°44'E, 325-400 m, 1 lv.

Tonga Islands: BORDAU 2, stn DW1610, 22°59'S, 175°47'W, 216-237 m, 1 dd.

Fiji: BORDAU 1, stn DW1472, 19°40'S, 178°10'W, 262-266 m, 2dd. - Stn DW1473, 19°43'S, 178°10'W, 270-288 m, 1 lv.

Range and habitat. Known from the southern Coral Sea on Chesterfield-Bellona Plateau, Nova Bank, Argo Bank, Kelso Bank, Capel Bank, from Hunter and Matthew Volcanos and from off Vanuatu, Fiji and Tonga Islands. Bathymetric range 223-325 m for living specimens. Empty shells between 223 and 345 m.

On Capel Bank living on hard bottom: rocks and coral limestone.

P. alabastrum is sympatric with *P. boucheti* at most of the station at Nova Bank (CHALCAL stn 66, 67, MUSORSTOM 5 stn 302, 303, 318, 320), Argo Bank (MUSORSTOM 5 stn 290, 294, 295) and Capel Bank (MUSORSTOM 5 stn 255, 256 & 258, and is sympatric with *P. deforgesii* at Nova Bank (MUSORSTOM 5 stn 320), Argo Bank (MUSORSTOM 5 stn 290), Kelso Bank (MUSORSTOM 5 stn 280) and Capel Bank (MUSORSTOM 5 stn 270).

Description. Shell up to 33 mm high, thick, solid. Shape broad, rather inflated, with rounded base and conical spire. Snow-white with dull or frosted appearance, occasionally pale brown (BORDAU 1, stn DW1473), protoconch sometimes brownish. Juveniles occasionally with a pale brown band at midwhorl.

About 3 to 3 3/4 protoconch whorls, earliest 1/2 to 3/4 whorl smooth and convex, tip (about 1/6 - 1/4 whorl by estimation) eroded or decollate in all studied specimens, last whorls (2 1/2 to 3 whorls) with 2 sharp spiral keels, subsutural slope of last 3/4 to 1/6 part with some semi-lunar axial riblets. Transition to teleoconch marked by strongly curved, axial rib, followed by broader first teleoconch interspace, ornamented with spiral sculpture.

About 7 teleoconch whorls. 6 fine spiral cords on first teleoconch whorl, 7-9 on second, 8-11 on third whorl, becoming gradually weaker towards fourth whorl. Penultimate and body whorl nearly smooth.

3-8 spiral cords on base, sometimes alternating strong or weak. About 7 spiral cords on siphonal canal.

12-14 strong, rounded axial ribs on first teleoconch whorl, adapical part slightly extending over suture, covering preceding whorl. 8-10 on body whorl, strong along whorl, weaker on base, ending at transition to siphonal canal.

Aperture semi-ovate. Outer lip thick, abapically somewhat thinner. Columella smooth, glossy, with fine internal spiral fold separating columella from siphonal canal. Both columella and outer lip ornamented with a small and sharp tooth near transition to siphonal canal.

Operculum thin, corneous, pale brown. Shape elongate, semi-triangular, abapically pointed with terminal nucleus.

Comparison. *Phos alabastrum* sp. nov. is close to *P. sculptilis* (fig. 6-7), but can be distinguished at once by the smooth surface without strong spiral cords, by the white or brownish apex (instead of reddish) with 3 - 3.5 whorls (instead of 2.5).

The fossil *Phos bakeri* Ladd, 1976 (Pleistocene of Kere Rivers, New Hebrides) is similar in shape and sculpture; but *P. alabastrum* sp. nov. differs by the lower number of axial ribs, the weaker spiral cords on the base, and the slightly broader shape.

For difference with *Phos boucheti* sp. nov. see under that species.

Etymology. Derived from the Latin, *alabastrum* (noun, neuter), which is a small, pocket-sized bottle. Small in size and inflated in shape, *P. alabastrum* resembles a flacon. Moreover, being white in colour, it looks as made from alabaster, the soft marble-like mineral.

***Phos boucheti* sp. nov.**

Figs. 8-11, 17

Type material. Holotype (27.0 mm) and paratypes 1-2 (CHALCAL stn D64) MNHN. Paratypes 3-8 (MUSORSTOM 5 stn DW255) 2 MNHN, 1 AMNH, 1 AMS, 1 NMNZ, 1 KF. Paratype 9 (MUSORSTOM 5 stn DW256) MNHN.

Type locality. CHALCAL 1984, stn. D64, Coral Sea, Nova Bank, 22°11'50"S, 159°15'40"E, 305 m.

Material examined. Southern Coral Sea: Nova Bank: CHALCAL: stn D63, 22°11'00"S, 159°14'70"E, 305 m, 3 dd (1 juv). - Stn D64, 22°11'50"S, 159°15'40"E, 305 m, 7 dd (1 juv). - Stn D66, 22°26'40"S, 159°19'80"E, 320 m, 2 dd. - Stn D67, 22°34'80"S, 159°09'40"E, 277 m, 1 dd. - MUSORSTOM 5: stn DW302, 22°10'S, 159°23'E, 345-360 m, 1 dd. - Stn DW303, 22°12'S, 159°23'E, 332 m, 1 dd. - Stn DW304, 22°10'S, 159°26'E, 385-420 m, 7 dd (3 juv). - Stn CP307, 22°11'S, 159°24'E,

345-350 m, 1 dd. - Stn CP309, 22°10'S, 159°23'E, 340 m, 2 dd (1 juv). - Stn CP311, 22°14'S, 159°24'E, 320 m, 1 lv, 1 dd. - Stn CP312, 22°17'S, 159°25'E, 315-320 m, 3 dd (1 juv). - Stn CP315, 22°25'S, 159°27'E, 330-335 m, 3 dd (1 juv). - Stn CP318, 22°27'S, 159°21'E, 330 m, 1 dd. - Stn CP320, 22°25'S, 159°13'E, 315 m, 1 dd. - **Argo Bank:** MUSORSTOM 5: stn DW290, 23°06'S, 159°26'E, 300 m, 2 lv alc juv, 3 dd (1 juv). - Stn DC291, 23°08'S, 159°28'E, 300 m, 3 lv alc (1 juv), 2 dd (1 juv). - Stn DW294, 23°11'S, 159°30'E, 272 m, 2 dd (1 juv). - Stn DW295, 23°13'S, 159°32'E, 279 m, 2 lv, 8 dd (4 juv). - Stn DW296, 23°13'S, 159°36'E, 278 m, 1 lv, 5 dd. - Stn DW298, 22°44'S, 159°22'E, 320 m, 4 dd (3 juv). - Stn DW299, 22°48'S, 159°24'E, 360-390 m, 2 lv juv, 1 dd. - **Capel Bank:** MUSORSTOM 5: stn DW255, 25°15'S, 159°55'E, 280-295 m, 9 lv (4 juv), 9 dd (3 juv). - Stn DW256, 25°18'S, 159°53'E, 290-300 m, 2 lv (1 juv) 4 dd (2 juv). - Stn DW258, 25°33'S, 159°46'E, 300 m, 5 dd (1 juv). - Stn DW272, 24°41'S, 159°43'E, 500-540 m, 5 lv alc (2 juv).

Tonga Islands: BORDAU 2: stn 1607, 22°15'S, 175°23'W, 356-367 m, 2 dd (1 juv). - Stn 1611, 23°00'S, 175°47'W, 278-323 m, 2 dd (1 juv).

Range and habitat. Known from 3 seamounts south of Chesterfield-Bellona Plateau (southern Coral Sea): Nova Bank, Argo Bank, Capel Bank and from off Tonga Islands. Not yet recorded from Kelso Bank. Bathymetric range 278-500 m with certainty. Empty shells between 272 and 385 m.

On Capel Bank living on hard bottom: rocks and coral limestone.

P. boucheti is sympatric with *P. alabastrum* at Nova Bank (CHALCAL stn 66, 67, MUSORSTOM 5 stn 302, 303, 318, 320), Argo Bank (MUSORSTOM 5 stn 290, 294, 295) and Capel Bank (MUSORSTOM 5 stn 255, 256 & 258), and is sympatric with *P. deforgesii* at Nova Bank (MUSORSTOM 5 stn 315, 320) and Argo Bank (MUSORSTOM 5 stn 290).

Description. Shell up to 28 mm high, thin but solid. Shape rather broad with rounded base and conical spire. Whitish, over yellowish-brown to pale brown. Protoconch whitish, occasionally pale brownish.

About 3 to 3 3/4 protoconch whorls, earliest 1/2 to 3/4 whorl smooth and convex, tip (about 1/6 - 1/4 whorl by estimation) eroded or decollate in all studied specimens, last whorls (2 1/2 to 3 whorls) with 2 sharp spiral keels, subsutural slope of last 1/2 or 3/4 part with some semi-lunar axial riblets. Transition to teleoconch marked by last strongly curved, axial rib, followed by broader first teleoconch interspace, ornamented with spiral sculpture.

About 6 or 7 flattened teleoconch whorls. 6 fine spiral cords on first teleoconch whorl, 7-9 on second, 8-11 on third whorl, becoming gradually weaker towards fourth whorl. Penultimate and body

whorl smooth. 4-10 spiral cords on base, sometimes alternating well developed or fine. 30-36 hardly visible grooves on siphonal canal.

10-12 high, rather sharp axial ribs on first teleoconch whorl, adapically slightly extending over suture, covering preceding whorl. 11-15 high, rather sharp axial ribs on body whorl, strong along whorl, weaker on base, ending at transition to siphonal canal, with broad interspaces.

Aperture triangular. Outer lip adapically thick, abapically sharp. Columellar callus thin, smooth and glossy, with fine internal spiral undulation separating columella from siphonal canal. Both columella and outer lip ornamented with a small and sharp tooth near transition to siphonal canal.

Operculum thin, corneous, pale brown. Shape elongate, semi-triangular, abapically pointed with terminal nucleus.

Comparison. *Phos boucheti* sp. nov. is close to *P. alabastrum* sp. nov., but can be distinguished by the more slender shape, by the yellowish colour, by a usual higher number of axial ribs which are more narrow with broader, rather "flat" (instead of concave) interspaces and by the usually presence of spiral cords, still on the fifth whorl.

Etymology. This species is named to honour Philippe Bouchet for his many great contributions to malacology and especially for his indefatigable effort to investigate the fauna around New Caledonia.

***Phos deforgesii* sp. nov.**

Figs. 12-15, 18

Type material. Holotype (12.6 mm) and paratypes 1-2 (MUSORSTOM 5 stn DW335) MNHN. Paratypes 3-10 (MUSORSTOM 5 stn DW346) 2 MNHN, 1 AMNH, 1 AMS, 1 NMNZ, 1 KF.

Type locality. MUSORSTOM 5, stn DW335, Coral Sea, Chesterfield, 20°03'S, 158°45'E, 315 m.

Material examined. Southern Coral Sea: Chesterfield plateau: MUSORSTOM 5: stn DW335, 20°03'S, 158°45'E, 315 m, 3 dd. - Stn DW346, 19°40'S, 158°27'E, 245-252 m, 7 lv alc, 49 dd (19 juv). - Stn DW347, 19°39'S, 158°28'E, 260 m, 6 dd (1 juv). - Stn DW348, 19°36'S, 158°32'E, 260 m, 1 dd. - Stn DW349, 19°34'S, 158°34'E, 275 m, 5 dd (2 juv). - Stn DW350, 19°34'S, 158°35'E, 280 m, 4 lv alc (1 juv). - Stn DW353, 19°27'S, 158°40'E, 290 m, 1 dd. - Stn DC375, 19°52'S, 158°30'E, 300 m, 1 dd. - Stn DC376, 19°51'S, 158°30'E, 280 m, 1 dd. - **CORAIL:** stn DW114, 19°25'S, 158°38'E, 217 m, 5 dd (1 juv). - Stn DW167, 19°46'S, 158°29'E, 270 m, 1 lv, 3 dd. - **Nova Bank:** MUSORSTOM 5: stn CP315, 22°25'S, 159°27'E, 330-335 m, 1 lv alc. - Stn CP320,

22°25'S, 159°12'E, 315 m, 1 lv alc. - **Argo Bank:** MUSORSTOM 5: stn DW290, 23°06'S, 159°26'E, 300 m, 4 lv alc (1 juv). - **Kelso Bank:** MUSORSTOM 5: stn DW280, 24°10'S, 159°36'E, 270 m, 1 lv alc. - **Capel Bank:** MUSORSTOM 5: stn DW270, 24°49'S, 159°34'E, 223 m, 2 dd. - Stn CP275, 24°47'S, 159°40'E, 285 m, 5 lv alc (1 juv).

Range and habitat. Known from Chesterfield Plateau (southern Coral sea), Nova Bank, Argo Bank, Kelso Bank and Capel Bank. Bathymetric range 270-345 m for living specimens. Empty shells between 217 and 315 m.

P. deforgesi sp. nov. is sympatric with *P. alabastrum* at Nova Bank (MUSORSTOM 5 stn 320), Argo Bank (MUSORSTOM 5 stn 290), Kelso Bank (MUSORSTOM 5 stn 280) and Capel Bank (MUSORSTOM 5 stn 270), and is sympatric with *P. boucheti* at Nova Bank (MUSORSTOM 5 stn 315, 320) and Argo Bank (MUSORSTOM 5 stn 290).

On Capel Bank living on hard bottom: rocks and coral limestone.

Description. Shell up to 14.5 mm high, thin but solid, semi-transparent. White, occasionally with 2 or 3 pale orange-brown spiral bands (subsuturally, on siphonal canal and, when present, on midwhorl). About 3 3/4 to 4 1/4 smooth, convex, white protoconch whorls, first 2 whorls rather pointed, last 1 1/4 - 1 1/2 whorls inflated. Transition to teleoconch marked by 3-6 broad, strongly curved, axial ribs with narrow interspaces.

4 1/2 - 4 3/4 teleoconch whorls.

First teleoconch whorl with about 5 weak and hardly visible, low, smooth spiral cords, 5 weak cords on second and 10-13 on penultimate whorl, occasionally stronger. Interspaces broad. Body whorl with 16-19 spiral cords, abapically slightly stronger and with broader interspaces, occasionally alternating slightly finer with slightly stronger. Siphonal canal with 4 low cords.

First teleoconch whorl with 11 or 12 sharp, straight axial cords. Interspaces broad. 15 or 16 cords on penultimate whorl, 13 on body whorl with 1-3 additional ribs fused together to a varix on lip.

Aperture semi-oval, with 12 strong internal lirae, occasionally with single additional knob between abapical lirae. Outer lip thick, edge smooth, with conspicuous siphonal notch. Columella smooth, glossy, with 2 strong folds, occasionally covered with some low, wrinkled denticles.

Comparison. *Phos deforgesi* sp. nov. differs from the other two species which are described in this paper by the smooth and convex protoconch whorls (without spiral cords nor axial riblets) and by the teleoconch whorls sculptured with spiral cords. Some species belonging to *Hinia* (Nassariidae) looks similar but differ by the absence of a striking siphonal notch.

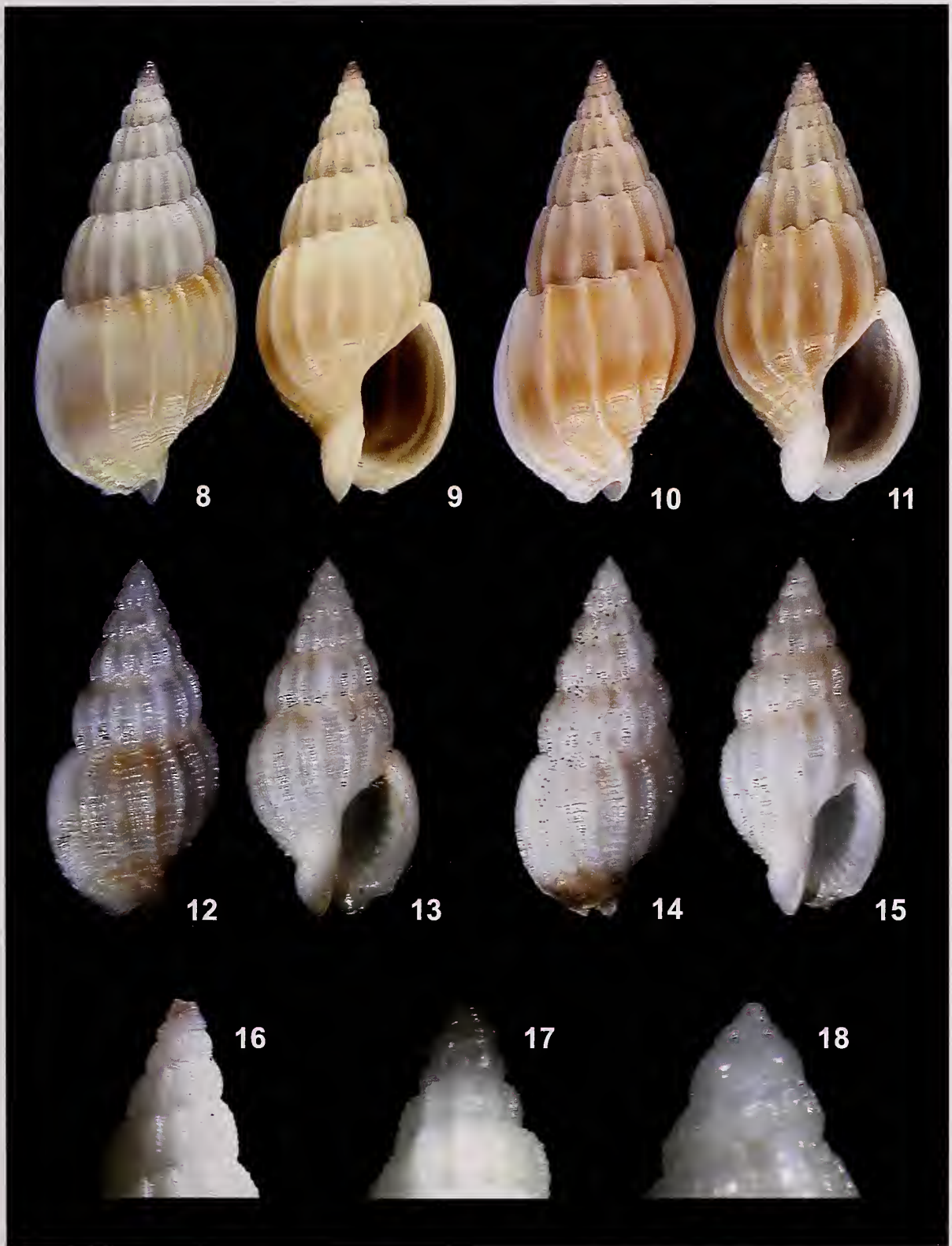
Etymology. This species is named in honour of Bertrand Richer de Forges, who was the first to conduct scientific dredging for molluscs in Chesterfield region, to honour his contributions to our knowledge of the New Caledonian fauna. Hereby we also remember *Perotrochus deforgesi* Métivier, 1990, another species from Chesterfield-Bellona Plateau.

ACKNOWLEDGMENTS

I am thankful to Philippe Bouchet, Virginie Héros (Muséum national d'Histoire naturelle, Paris, France) for the loan of material and help, to Pierre Lozouet (Muséum national d'Histoire naturelle, Paris, France) and Bertrand Richer de Forges (ORSTOM, New Caledonia) for bibliographical help, to Guido T. Poppe (Belgium) for digital images and for undiminished support, to Roland Houart (Belgium) for comments and corrections, and to David Monsecour (Belgium) for correcting the English text.

Figures 8-18

8-11. *Phos boucheti* sp. nov., Coral Sea, Nova Bank, 22°11'50"S, 159°15'40"E, 305 m deep. 8-9. Holotype, 27.0 mm. 10-11. Paratype 1, 25.2 mm; **12-15.** *Phos deforgesi* sp. nov., Coral Sea, Chesterfield, 20°03'S, 158°45'E, 315 m deep. 12-13. Holotype, 12.6 mm. 14-15. Paratype 1, 13.8 mm; **16.** *Phos alabastrum* sp. nov. Apex of holotype; **17.** *Phos boucheti* sp. nov. Apex of holotype; **18.** *Phos deforgesi* sp. nov. Apex of holotype.



REFERENCES

- Bouchet, P. (ed.) 1994. Résultats des Campagnes MUSORSTOM, volume 14. *Mém. Mus. natn. Hist. nat.*, 167: 1-654.
- Bouchet, P. & Marshall, B. (eds.) 2001. Tropical Deep-Sea Benthos, volume 22. *Mém. Mus. natn. Hist. nat.*, 185: 1-406.
- Crosnier, A. & Bouchet, P. (eds.) 1991. Résultats des Campagnes MUSORSTOM, volume 7. *Mém. Mus. natn. Hist. nat. (A)*, 150: 1-259.
- Fraussen, K. & Hadorn, R. 2003. Six new Buccinidae (Mollusca: Gastropoda) from New Caledonia. *Novapex*, 4 (2-3): 33-50.
- Harasewych, M. G. 1991. Mollusca Gastropoda: Columbariform Gastropods of New Caledonia. *In*: A. Crosnier & P. Bouchet (eds.), Résultats des Campagnes MUSORSTOM, vol. 7. *Mém. Mus. natn. Hist. nat. (A)*, 150: 243-259.
- Ladd, H. S. 1976. New Pleistocene Neogastropoda from the New Hebrides. *Nautilus*, 90 (4): 127-138.
- Richer de Forges, B. 1990. Explorations for bathyal fauna in the New Caledonian economic zone. *In*: A. Crosnier (ed.), Résultats des Campagnes MUSORSTOM, volume 6. *Mém. Mus. natn. Hist. nat. (A)*, 145: 9-54.
- Richer de Forges, B. 1993. Campagnes d'exploration de la faune bathyale faites depuis mai 1989 dans la zone économique de la Nouvelle-Calédonie. Listes des stations. *In*: A. Crosnier (ed.), Résultats des Campagnes MUSORSTOM, volume 10. *Mém. Mus. natn. Hist. nat. (A)*, 156: 27-32.
- Richer de Forges, B., Bouchet, P., Dayrat, A., Warén, A. & Philippe, J. S. 2000. La campagne BORDAU 1 sur la ride de Lau (iles Fidji). Compte rendu et liste des stations. *In*: A. Crosnier (ed.), Résultats des Campagnes MUSORSTOM, volume 21. *Mém. Mus. natn. Hist. nat. (A)*, 184: 25-38.
- Richer de Forges, B., Faliex, E. & Menou, J. L. 1996. La campagne MUSORSTOM 8 dans l'archipel de Vanuatu. Compte rendu et liste des stations. *In*: A. Crosnier (ed.), Résultats des Campagnes MUSORSTOM, volume 15. *Mém. Mus. natn. Hist. nat. (A)*, 168: 9-32.
- Richer de Forges, B., Laboute, P. & Menou, J. L. 1986. La campagne MUSORSTOM 5 aux îles Chesterfield; N. O. "Coriolis" (5-24 octobre 1986). *Rapp.scient.techn.*, 41, ORSTOM/Nouméa: 1-31.
- Sowerby, G. B. 1866. Thesaurus Conchyliorum or Monographs of Genera of Shells. Vol. 3: 89-96, pl. 221-222. London, Sowerby.
- Vermeij, G. J. & Bouchet, Ph. 1998. New Pisaniinae (Mollusca, Gastropoda, Buccinidae) from New Caledonia, with remarks on *Cantharus* and related genera. *Zoosystema* 20(3): 471-785.
- Watson, R. B. 1886. The voyage of H.M.S. Challenger. Report on the Scaphopoda and Gastropoda collected by H.M.S. "Challenger", during the Years 1873-76. *Zool.Chall.Exp.*, 15(42): 1-756.
- Woodring, W. P. 1928. Miocene mollusks from Bowden, Jamaica. Part 2: Gastropods and discussion of results. *In*: Contributions to the Geology and Palaeontology of the West Indies. *Carnegie Inst.Washington*, no. 385. Pp. 459.